10 March 1971

Contractor Evaluation

Introduction

Useful evaluations of contractor performance on R&D contracts for the Agency can be generated from the data in the Contract Information System (CIS) file. The system proposed is intended to be illustrative of how the existing management information data may be exploited to provide evaluations based solely on contractor performance and the Project Officer's evaluation of the contractor's performance. To provide a broader base, supplementary evaluations from the Contracting Officer, Security Officer, auditor, or others associated with the Contract Team may be introduced.

In addition to the obvious inherent advantage of using existing data and therefore requiring no special inputs, the system can be operated in a very "open" manner. The Agency officers as well as the contractor should be fully informed of how the system is operated. This is advantageous to both groups.

The approach described here is flexible and can accommodate weighting to give any emphasis desired to either the CIS data or the supplementary inputs from other members of the Contract Team.

The basic scheme can be readily adapted to produce

special studies of a wide variety. Some of these are suggested under the Miscellaneous section.

Inputs

Two sources of data which may be used for contractor evaluation are currently included in the CIS data:

      a. The contractor's financial and work plan and the accomplishment against this plan, and

      b. The Project Officer's evaluation.

Depending upon the type of contract, the contractor's proposal should contain a summary of the plan by which he intends to perform the proposed work. This is entered into the CIS as the contractor's plan showing for each month the percent of the total effort expected to be accomplished and the percent of the price of the contract expected to be expended through that month. During the performance of the contract, the contractor reports his actual percent completion and percent expended on a monthly basis. If the contract is amended to change the schedule or scope of work, a revision of the plan from that point forward may be made.

The Project Officer submits his estimate of the percent of the work completed every two months. In addition, he also evaluates the contractor's overall performance by selecting one of seven different ratings ranging from unsatisfactory to outstanding.

The CIS may thus contain monthly indications of the performance of the contractor against his own plan and bimonthly estimates of completion, and an evaluation by the Project Officer. For those contracts for which the contractor does not provide a plan, e.g., Fixed Price, a single set of data is available indicating whether the contractor completed on time and within cost, and any deviation from the expected completion time and cost may be derived. Bimonthly Project Officer estimates of completion and evaluation are entered regardless of the type of contract.

Additional evaluations by the Contracting Officer, Security Officer, or others in the project Contracting Team, could be added into the CIS, extracted from other files, or entered separately into the evaluation process.

Procedure

Because it represents the more complex case it will be assumed that the Contractor Plan exists.

The deviation of the contractor, both financially and in time from his initial plan can be readily calculated by subtracting the actual percentages complete/spent from the planned percentages and dividing them by the number of reports to obtain average deviations.

There may be occasions when the contractor will report perfect alignment between performance and plan for several months and then suddenly report a large deviation. This

normally indicates that his accounting or progress monitoring techniques are not functioning very well. A simple algorithm to penalize the contractor and give greater utility to the evaluation could be developed in several ways. For example, if the deviation reported in any month had an absolute value greater than 10% over the preceding month, that deviation could be spread on a diminishing basis into prior months. As a numerical illustration, suppose the contractor reported perfect performance for five months on a six month contract, and then in the final report on the sixth month indicated 130% expenditure, i.e., a 30% overrun. If the deviation were simply the summation of the monthly deviations divided by the number of months, the average deviation would be 5%. On the other hand, it might be more reasonable to expect that such a large deviation had accrued over the entire period of the contract. The deviations from the first month forward then would be 5%, 10%, 15%, 20%, 25%, and 30%. In this case, the sum (105) divided by the number of months (6) would give a more meaningful indication, i.e., an average deviation of 17%. Treatment such as this of sudden and unexpected changes should motivate the contractor to seriously plan and accurately report against his plan.

A numerical value can be assigned to each of the

Project Officer evaluation ratings and the summation of these divided by the number of ratings to provide an overall average. Here also some refinement might be desirable. A contractor should not be unduly penalized for a rough start if his overall performance has been excellent and, similarly, a good start should not receive too much weight if his overall performance was poor. The sequential ratings could be given different weights, but a satisfactory approach might simply be to give the average monthly ratings a weighting of, say, 0.6, but the final evaluation rating a weighting of 0.4. This would emphasize how the contractor finished up.

Because some Project Officers may be high raters, and others low raters, account should be taken of these personal differences. Ordinarily this is difficult or impossible, but in the case of the CIS all of the ratings for any one Project Officer against all contractors could be used to find the average rating which that Project Officer gave, and the variation and spread of his ratings. Multipliers could then be developed in order to normalize all of his ratings. This, of course, has no meaning if the Project Officer has only one contract, or perhaps has con- tracts with only one contractor. In some of these situations, however, adjustment could be made to bring that Project Officer's average into alignment with the average rating for that

contractor based on other Project Officers having contracts with that contractor. This fails, however, if there is only one contract with a contractor, or if all the contracts for a contractor are handled by a single Project Officer. Even so, some form of normalizing, so long as the procedure is well known, represents about the best that can be reasonably done in summing a number of subjective contractor evaluations.

A composite score can now be derived for the contractor by adding the contractor's score to the Project Officer's evaluation score using whatever weighting is desired, if any, on these two inputs. (If a financial deviation and performance deviation are taken separately, then three scores must be weighted and summed).

If additional evaluations, say, overall rating of from 0 - 1 are provided by other members of the Contract Team, the composite score may include these inputs also weighted. As a numerical example, suppose the system is operated such that 1.0 represents a perfect score, 0.75 is average etc. Suppose further that there are six inputs to the composite score: the contractor financial deviation, the contractor schedule deviation, a Project Officer rating, a Contracting Officer rating, a Security Officer rating, and an audit rating. The composite might be developed by multiplying each of the contractor inputs by 0.1, the Project and Contracting Officer

ratings by 0.3, and the Security and audit ratings by 0.1.
Any desirable emphasis could be used.

The contractor should not be unduly penalized for
his past sins, but neither should they be ignored. To
reflect this, some rules would have to be adopted for
adding up the composite scores on contracts according to
when they were performed. Presuming that data over three
years would be used, where available, a paradigm might
be followed to give a weighting of 0.6 to contracts per-
formed in the last twelve months, 0.3 to those performed
in the preceding twelve months, and 0.1 to contracts
performed in the year prior to that. The composite
ratings for the contracts completed during the past
twelve months would be averaged, and multiplied by the
weighting factor. The averaging process and weighting
would be repeated for contracts performed for the
preceding first and second year period. The sum of these
weighted composites would then be a three year composite.
If there were no contract completions more than a year
old, no weighting would be required. If contracts had
been completed only in the past two years, the first year
could be given, say, 0.66 and the second year 0.33.

Miscellaneous

To assist the Contracting Officers and Project
Officers, up-to-date composite ratings extending back as

far as three years might be sufficient in most cases. On
an annual basis it might be useful to provide more detail,
particularly for those contractors who either have a large
number of contracts or a high dollar volume of work with
the Agency. This detail might be prsented as shown in
Figure 1.

The composite ratings of the various officers
could be shown, the contracts listed, and the names of
the officers making the inputs listed. A variation which
might be meaningful and helpful in some cases would be
to generate such displays using data only for a single
twelve month period. In this way contractor performance
trends, security trends, etc., could be discerned. A
still more elaborate approach would be to plot on a single
chart the values for three years, and the three year com-
posite for each of the inputs, etc. This is illustrated
in Figure 2.

A variety of special studies could readily be
generated to satisfy particular needs. For example,
it would be possible to look at all the ratings given
by any Project Officer to all the various contractors
with whom he might have contracts. The same could be
done for the Contracting Officer, etc.

It would be possible to look at all the ratings
or composite evaluations for any contractor as given

Contractor X
FY 69-70-71
Overall - 0.82

```
Contracts
-------- OEL
-------- OEL
-------- TSD
-------- TSD
-------- etc.
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P.O.
--------
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C.O.
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-9-

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1.0 ┤
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    │       ┃         ┃ ┃
.75 ┤     ┃ ┃           ┃              ┃
    │     ┃ ┃           ┃            ┃ ┃
    │     ┃ ┃           ┃   ┃        ┃ ┃
.50 ┤     ┃ ┃           ┃   ┃        ┃ ┃
    │     ┃ ┃           ┃   ┃        ┃ ┃
    │     ┃ ┃           ┃   ┃        ┃ ┃
.25 ┤   ┃ ┃ ┃           ┃   ┃        ┃ ┃
    │     ┃ ┃           ┃   ┃        ┃ ┃
    │     ┃ ┃           ┃   ┃        ┃ ┃
  0 ┴───┸─┸─┸───────────┸───┸────────┸─┸──
      Sked   Funds     P.O     C.O.    S.O.       Aud.
      Contractor
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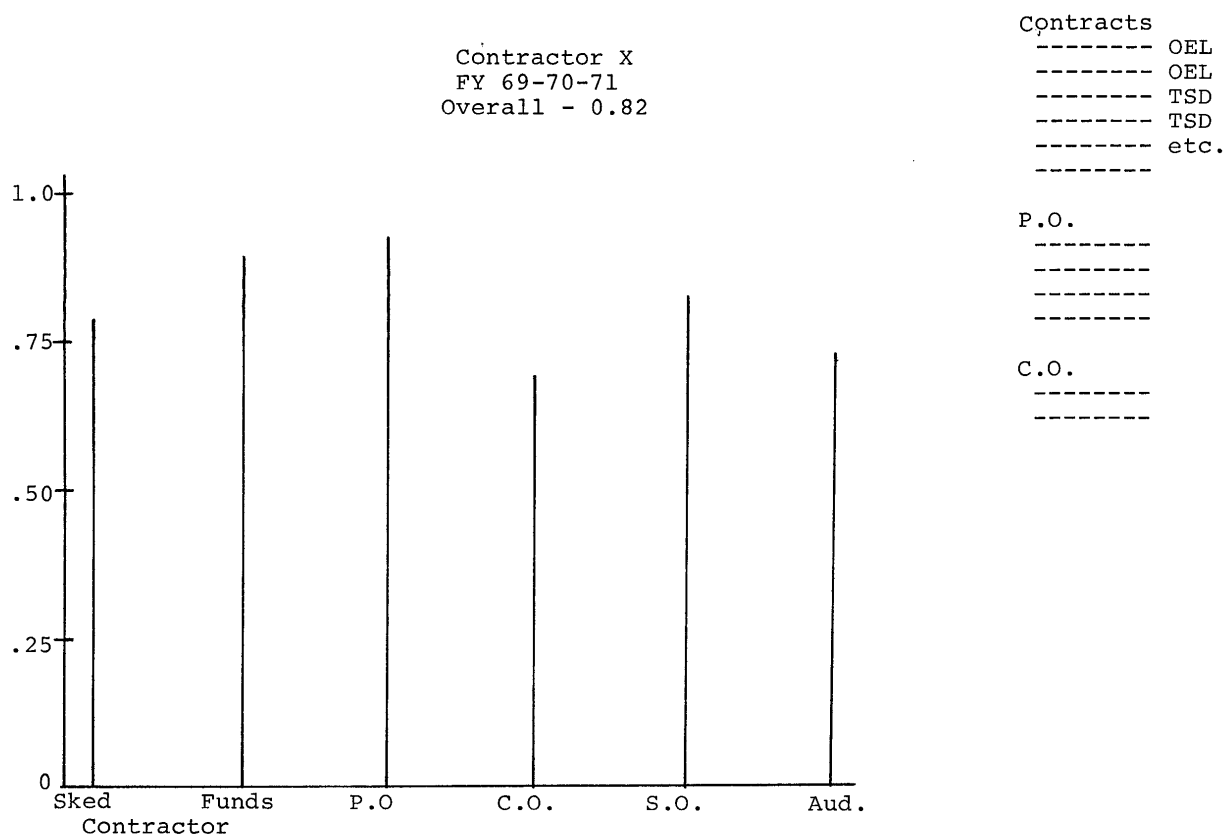
Figure 1. Evaluation Composite

Contractor X
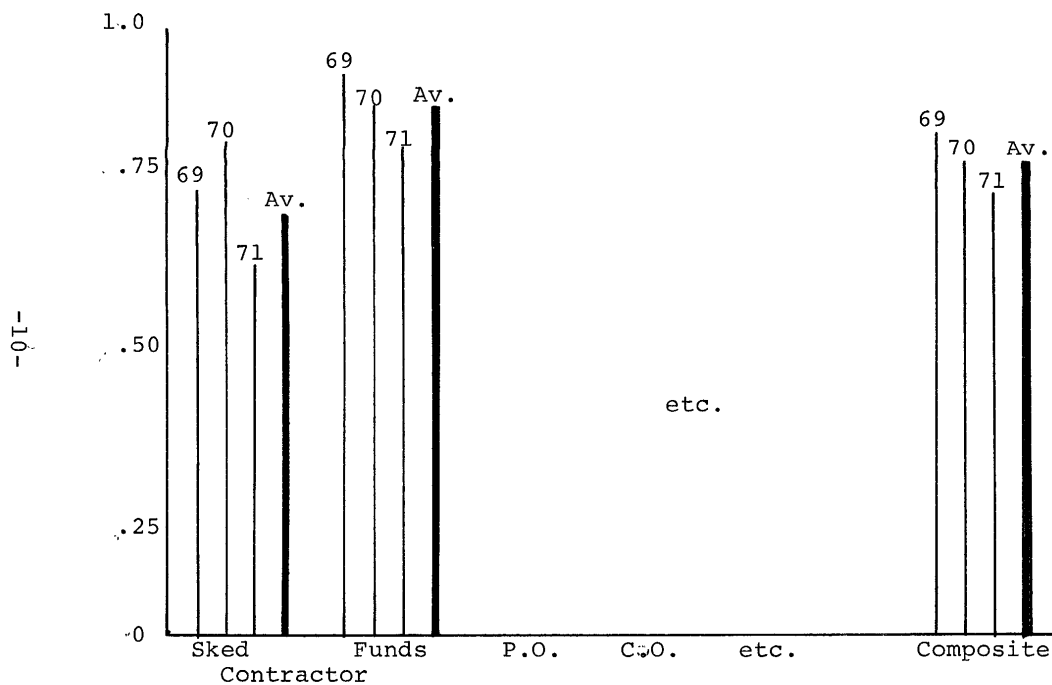FY 69-70-71
Overall - 0.82

Figure 2.   Evaluation Trends

by the various Project Officers that might have contracts with that contractor. Again, the same could be done for the ratings provided by the members of the Contract Team.

Contractor ratings or composite scores could be examined on an Agency-wide basis or by component. This might show, for example, that some contractors performed better for, say, OEL than TSD.

The type of analysis suggested above could also be done by first sorting the contracts by type of contract. This would show the variation in contractor performance depending upon whether the contract was CPFF, Fixed Price, etc.

Sorting by type of R&D could be used to evaluate contractor performance according to the kind of technical work performed--electronics, testing, etc. Regional studies could be made which might be very useful under circumstances such as those at the present time. Although it might be assumed that overhead rates, etc., of West Coast firms would rise and, consequently, deviations from expenditure plans would be greater in this area than, say, in the Midwest, this might not be the case due to the geographic diversity of subcontractors and suppliers.

Any group or combinations of the above, plus others

could be employed to make highly specialized studies.
As a trivial example, comparisons of contractor performance
for OEL vs. TSD on CPFF contracts in electronics work in
Ohio could be sorted out.

Conclusion

The Contract Information System contains much, if
not all, of the data which may be required to perform
a variety of types of contractor evaluations as well as
a data source for developing overall composite contractor
evaluation ratings which may be useful to the Project
Officer, the Contracting Officer, and other members of
the Contracting Team.

The input of only a small amount of additional data
by other members of the Contracting Team can significantly
enrich the meaningfulness and value of the evaluations.

The generation of the evaluations is straightforward,
and many different types of special studies can readily
be performed by pre-sorting according to the special
interest prior to consolidating the desired evaluation
ratings.